AMENDED CLAIMS
[received by the International Bureau on 09 January 2006 (09.01.2006);
original claims 4-8, 13-14, 16, 19-20, 25-27, 33, 34, 36, 40-50, amended;
claims 9, 17, 21 renumbered claim 1, claim 23 renumbered claim 22;
claims 51-65 added, remaining claims unchanged (7 pages)]

What is claimed is:

1. . An artificial tissue system, comprising:

(a) a matrix configured for biological contact with an implantable device, and

(b) a plurality of cells supported by said matrix, said cells promoting a biological interaction between said implantable device and a biological system.

2. The artificial tissue system of claim 1, wherein said cells include at least one member selected from the group consisting of biological cells, engineered cells, support cells, stem cells, artificial cells and hybrid cells.

3. The artificial tissue system of claim 1 or 2, wherein said cells promote biocompatibility between said implantable device and said biological system.

4. The artificial tissue system of claim 1 or 2, wherein said cells enhance the lifespan and/or the function of said implantable device.

5. The artificial tissue system of claim 1 or 2, wherein said biological system comprises an in vitro biological system.

6. The artificial tissue system of claim 1 or 2, wherein said biological system comprises an ex vivo biological system.

7. The artificial tissue system of claim 1 or 2, wherein said biological system comprises an in vivo biological system.

8. The artificial tissue system of claim 1 or 2, wherein said biological system comprises an ex ova chicken model.

9. The artificial tissue system of claim 1, wherein said biological system comprises a mammal.

10. The artificial tissue system of claim 9, wherein said mammal comprises a mouse.

11. The artificial tissue system of claim 10, wherein said mouse is immunodeficient.

12. The artificial tissue system of claim 9, wherein said mammal comprises a human.

13. The artificial tissue system of claim 1 or 2, wherein said biological system comprises natural skin tissue or artificial skin tissue.

14. The artificial tissue system of claim 1 or 2, wherein said

implantable device is a sensor.

15. . The artificial tissue system of claim 14, wherein said sensor is a glucose sensor.

16. The artificial tissue system of claim 1 or 2, wherein said matrix is configured to at least partially embed said implantable device.

17. The artificial tissue system of claim 1, wherein said cells induce the growth of biological tissue in and/or between said biological system and/or said artificial tissue system.

18. The artificial tissue system of claim 17, wherein said biological tissue comprises vascular structures.

19. The artificial tissue system of claim 1 or 2, wherein said cells are configured to suppress deleterious reactions between said implantable device and said biological system and/or said artificial tissue system.

20. The artificial tissue system of claim 1 or 2, wherein said matrix comprises at least one member selected from the group consisting of biological matrices, engineered matrices, synthetic matrices, and hybrid matrices.

21. The artificial tissue system of claim 1, wherein said artificial tissue system further comprises at least one genetic element supported by said matrix.

22. The artificial tissue system of claim 21, wherein said at least one genetic element is a member selected from the group consisting of biological genetic elements, synthetic genetic elements and hybrid genetic elements.

23. The artificial tissue system of claim 22, wherein said artificial tissue system further comprises at least one response modifier supported by said matrix.

24. The artificial tissue system of claim 23, wherein said response modifier is at least one member selected from the group consisting of cell response modifiers and tissue response modifiers.

25. The artificial tissue system of claim 1 or 2, wherein said system further comprises a support system and/or a delivery system comprising a gel, a paste and/or a polymer.

26. The artificial tissue system of claim 1 or 2, wherein said artificial tissue system is configured to evaluate the function and/or the lifespan of said implantable device.

27. An implant comprising an implantable device in biological contact with the artificial tissue system of claim 1 or 2.

28. An implant system comprising:

(a) an implantable device,

(b) a matrix in biological contact with said implantable device, and

(c) a plurality of cells supported by said matrix, said cells promoting a biological interaction between said implantable device and a biological system.

29. A method of implanting a device in a biological system, comprising the steps of:

(a) obtaining said device,

(b) obtaining a matrix,

(c) placing said device in biological contact with said matrix,

(d) inserting cells into said matrix, said cells being capable of promoting a biological interaction between said implantable device and said biological system, and

(e) implanting said matrix into said biological system.

30. The method of claim 29, wherein step (d) occurs before step (e).

31. The method of claim 29, wherein step (e) occurs before step (d).

32. The method of any one of claims 29-31, wherein step (c) occurs before step (d).

33. The method of claim 29 or 30, wherein step (e) occurs before step (c).

34. The method of claim 29 or 30, wherein said biological system comprises skin tissue and at least some of said cells are configured to promote vascularization of said skin tissue.

35. The prolonged use of an implant formed by the method of claim 29, wherein additional cells are periodically inserted into said matrix during use of said implant.

36. A system for testing the effectiveness of an implant comprising the artificial tissue system of claim 1 or 2.

37. An artificial implant system in biological contact with a biological system comprising:

(a) a cellular component, said cellular component includes at least one cellular community which induces a biological response in the biological system;

(b) a matrix material, said matrix material being associated with a portion of the cellular community ; and

(c) an implant device having a biological interface wherein said biological interface is associated with the matrix material and the biological system.

38. The artificial implant system in biological contact with a biological system of claim 37, wherein the biological response includes neovascularization.

39. The artificial implant system in biological contact with a biological system of claim 37 or 38, wherein the biological system is a mammal.

40. The artificial implant system in biological contact with a biological system of claim 37 or 38, wherein the cellular component includes a genetically engineered cell which produces an over expression of VEGF.

41. The artificial implant system in biological contact with a biological system of claim 37 or 38, wherein the matrix material includes a cell population derived from the biological system.

42. The artificial implant system in biological contact with a biological system of claim 37 or 38, wherein the cellular community includes engineered and/or non-engineered cells.

43. The artificial implant system in biological contact with a biological system of claim 37 or 38, wherein the cellular component includes a tissue response mediator and/or a cellular response mediator.

44. The artificial implant system in biological contact with a biological system of claim 37 or 38, wherein the cellular component includes normal VEC stem cells and VEGF-over expressing stem cells.

45. The artificial implant system in biological contact with a biological system of

claim 37 or 38, wherein the cellular component includes normal VEC stem cells and SDF-1 over expressing Stem cells.

46. The artificial implant system in biological contact with a biological system of claim 37 or 38, wherein the cellular component further includes at least one compound of the group consisting of nicotinamide, poly-ornithine, RA, dexamethasone, ascorbate, or β-glycerol phosphate.

47. The artificial implant system in biological contact with a biological system of claim 37 or 38, wherein the cellular component includes at least one member selected from the group consisting of basement membrane and normal vascular stem cells; (basement membrane and cytokines bound to basement membrane) and normal vascular stem cells; basement membrane and normal vascular stem cells and engineered support cells; basement membrane and normal vascular stem cells and engineered stem cells; (basement membrane and cytokines bound to the basement membrane) and normal vascular stem cells and engineered support cells; or (basement membrane and cytokines bound to the basement membrane) and normal vascular stem cells and engineered stem cells.

48. The artificial implant system in biological contact with a biological system of claim 37 or 38, wherein the cellular component includes VEC stem cells, cytokines and/or cytokine producing support cells, and wherein the biological response includes neovascularization associated with the implant device.

49. The artificial implant system in biological contact with a biological system of claim 37 or 38, wherein the cellular community includes cells having an hCAR.

50. A system for compatibilizing an implant with an implant-receiving biological system comprising the artificial tissue system of claim 1 or 2.

51. The artificial tissue system of claim 1 or 2, wherein the matrix comprises a gel.

52. The implant system of claim 28, wherein the matrix comprises a gel.

53. The method of claim 29 or 30, wherein the matrix comprises a gel.

54. The artificial implant system of claim 37 or 38, wherein the matrix material comprises a gel.

55. The implant system of claim 28, wherein the implant system protects the implantable device from toxic effects of the biological system.

56. The implant system of claim 28, wherein the implant system protects the biological system from toxic effects of the implantable device.

57. The method of claim 29, further comprising, before step (e), forming an implantation pocket in the biological system.

58. The artificial implant system of claim 37, wherein the biological response includes inhibition of inflammation.

59. The artificial implant system of claim 37, wherein the biological response includes inhibition of fibrosis.

60. An implant system comprising:

(a) an implantable device comprising a sensor, and

(b) a matrix comprising a gel in biological contact with said implantable device, said matrix promoting biocompatibility of said implantable device and a biological system.

61. A method of improving the biocompatibility of a sensor with a tissue system comprising placing a matrix comprising a gel between the sensor and the tissue system.

62. A method of implanting a device in a biological system, comprising:

(a) obtaining an implantable device,

(b) forming an implantation pocket in the biological system by injecting a biocompatible material, and

(b) implanting said implantable device in said implantation pocket.

63. The method of claim 62, wherein the biocompatible material comprises a solution.

64. The method of claim 62, wherein the biocompatible material comprises a matrix.

65. The method of claim 62, wherein the device is a sensor.